

CLAIMS

I claim:

1. A method of making a composite structure, the method comprising:
 - (a) locating at least two peel plies on the bonding surface of a component; then
 - (b) inserting pins through the peel plies and into the component prior to curing of the component; then
 - (c) curing the component; then
 - (d) providing a woven preform having a base and two legs extending from the base, the legs defining a slot; then
 - (e) placing the base of the preform against the bonding surface of the component, the pins extending into the base of the preform; and
 - (f) curing the preform to adhere the base of the preform to the component.

2. The method of claim 1, further comprising:

inserting a second component into the slot of the preform after step (e) and before step (f);
and

completing step (f) with the second component in the slot.

3. The method of claim 1, further comprising:

inserting a rigid sizing tool into the slot of the preform after step (e) and before step (f);

completing step (f) with the sizing tool in the slot;

removing the sizing tool after step (f), the slot being sized for insertion of a second component; and

inserting the second component into the slot and adhering the second component to the preform.

4. A method of joining first and second composite components, the method comprising:

(a) inserting Z-pins into the first component prior to curing the first component, ends of the Z-pins extending above a bonding surface of the first component and forming a stubble;

(b) curing the first component;

(c) providing a woven preform having a base and two legs extending from the base, the legs defining a slot;

(d) placing the base of the preform against the bonding surface of the first component, the stubble extending into the base of the preform;

- (e) inserting the second component into the slot of the preform; and
- (f) curing the preform to adhere the base of the preform to the first component and the legs of the preform to the second component, joining the components with the preform.

5. The method of claim 4, further comprising:

in step (d), inserting adhesive between the base of the preform and the first component.

6. The method of claim 4, further comprising:

in step (e), inserting adhesive between the legs of the preform and the second component.

7. The method of claim 4, further comprising:

before step (a), locating at least two peel plies on the bonding surface of the first component and removing the peel plies after step (b) and before step (d).

8. The method of claim 4, further comprising:

before step (a), locating at least two peel plies on the bonding surface of the first component;

after step (b) and before step (d), removing at least one of the peel plies and trimming the stubble to a height equal to a height of the peel plies that remain on the bonding surface; and

removing the remaining peel plies after trimming the stubble but before step (d).

9. The method of claim 4, further comprising:

before step (a), locating at least two woven-fabric peel plies on the bonding surface of the first component and removing the peel plies after step (b) and before step (d).

10. The method of claim 4, wherein:

the peel plies are formed from nylon fibers.

11. The method of claim 4, wherein:

the peel plies are formed from glass fibers.

12. The method of claim 4, further comprising:

before step (a), locating an elastomeric spacer on the bonding surface of the first component;

after step (b) and before step (d), trimming the stubble to a height equal to a height of the spacer; and

removing the spacer after trimming the stubble but before step (d).

13. A method of joining first and a second composite components, the method comprising:

- (a) inserting Z-pins into the first component prior to curing the first component, the Z-pins extending above a bonding surface of the first component and forming a stubble; then
- (b) curing the first component; then
- (c) providing a woven preform having a base and two legs extending from the base, the legs defining a slot; then
- (d) placing the base of the preform against the bonding surface of the first component, the stubble extending into the base of the preform; then
- (e) inserting a rigid sizing tool into the slot; then
- (f) curing the preform to adhere the preform to the first component and to shape the slot to a size of the tool; then
- (g) removing the tool and applying an adhesive into the slot; then
- (h) inserting the second component into the slot, the adhesive bonding the second component to the preform, the second component having a smaller width than the tool.

14. The method of claim 13, further comprising:

before step (a), locating at least two peel plies on the bonding surface of the first component and removing the peel plies after step (b) and before step (d).

15. The method of claim 13, further comprising:

before step (a), locating at least two woven-fabric peel plies on the bonding surface of the first component and removing the peel plies after step (b) and before step (d).

16. The method of claim 13, further comprising:

before step (a), locating an elastomeric spacer on the bonding surface of the first component and removing the spacer after step (b) and before step (d).

17. A method of joining a preform to a panel, the method comprising:

- (a) inserting Z-pins into a composite panel prior to curing the panel, the Z-pins extending above a bonding surface of the panel and forming a stubble; then
- (b) curing the panel; then
- (c) providing a woven preform having a base and at least one leg that extends from the base, the preform being infused with uncured resin; then

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- (d) placing the base of the preform against the bonding surface of the panel, the stubble extending into the base of the preform; then
- (e) curing the preform with each leg in a desired orientation.

18. The method of claim 17, further comprising:

- (f) attaching a composite component to at least one leg.

19. The method of claim 17, further comprising:

before step (a), locating at least two peel plies on the bonding surface of the panel and removing the peel plies after step (b) and before step (d).

20. The method of claim 17, further comprising:

before step (a), locating at least two woven-fabric peel plies on the bonding surface of the panel and removing the peel plies after step (b) and before step (d).

21. The method of claim 17, further comprising:

before step (a), locating an elastomeric spacer on the bonding surface of the panel and removing the spacer after step (b) and before step (d).